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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/537,318

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Mats Holmquist

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EXAMINER

XU, XIAOYUN

ART UNIT

PAPER NUMBER

1777

NOTIFICATION DATE

DELIVERY MODE

01/12/2011

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No. 10/537,318	Applicant(s) HOLMQUIST ET AL.	
	Examiner ROBERT XU	Art Unit 1777	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 November 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 23 is/are pending in the application.
- 4a) Of the above claim(s) 7-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 20, 21 and 23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The amendment and RCE filed on 11/22/2010 has been entered and fully considered. Claim 22 is canceled. Claims 1-21 and 23 are pending, of which Claims 7-19 are withdrawn from consideration, claims 1-6, 20, 21 and 23 are considered on merits. Claim 21 is amended. Claim 23 is newly added.

Response to Amendment

2. In response to amendment, the examiner withdraws objection and maintains rejection over the prior art established in the previous Office action.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. **Claims 1-5, 20, 21 and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Clarke et al. (US 2002/0142470) (Clarke).

In regard to Claim 1, Clarke discloses a microfluidic arrangement in one of the embodiments (Figure 5). The arrangement comprises

A) microfluidic devices, each of which comprises a set (set I) of essentially equal microchannel structures that are comprised within a planar layer of the device (35 in Figure 5) (layer I) (see paragraph [0024], Figure 5),

each of said microchannel structures comprises an internal microconduit portion in which an active liquid flow is used (see paragraph [0024], Figure 5); and

B) an instrument for processing microfluidic devices, the instrument comprises a spinner motor and a rotary member (see paragraph [0024], Figure 5);

I) the rotary member comprises a group of one or more seats for holding microfluidic devices, each of the seats is capable of

i) being positioned at the same radial distance as any of the other seats of the group (see paragraph [0024], Figure 5),

ii) aligning layer I essentially radially at an angle α relative to the spin plane with $45^\circ < \alpha \leq 90^\circ$ (see paragraph [0024], lines 1-4, Figure 5), such

that the layer I is fixed at the angle α in the seat (see paragraph [0024], lines 22-25, Figure 5B);

II) the internal microconduit portion has an upstream part that can be positioned at a shorter radial distance than a downstream part when the corresponding microfluidic device is placed in any of the seats (see paragraph [0024], Figure 6).

Clarke does not specifically disclose rotary member comprising not less than 10 and not more than 1000 of seats for holding one or more microfluidic devices. Clarke demonstrates a rotary member comprising 4 seats for holding microfluidic devices (see Figure 3). However, modifying Clarke's arrangement to include more seats in a rotary member is within the capability of ordinary skill in the art, because one only needs to increase the number of seats in each seat holder (36) from 1 to 3 or more, or increase the number of seat holders (36) by changing the shape of seat holder (36) from a $\frac{3}{4}$ volume spheroid to a plate to save space.

In regard to Claim 2, Clarke discloses that the arrangement can rotate the micro device seat 180 degree in vertical plane (see paragraph [0024] lines 1-3 in page 4) and 360 degree in horizontal plane (see paragraph [0024], lines 5-6 in page 4). By using predetermined combination of independent rotational movements of both the rotation cog-ring 38 and the $\frac{3}{4}$ spheroid 36, the micro device 35 can be placed in any orientation relative to the g-vector 46 in three dimensions (see paragraph [0024] last 2 lines in page 4, and lines 1-7 in page 5). The combination of independent rotation also adjusts the seats in the radial and/or axial direction (see Figure 5).

In regard to Claim 3, Clarke discloses that the arrangement can hold the seats at a fix radial position (see paragraph [0024], Figure 5).

In regard to Claim 4, Clark discloses that the microfluidic device has two planar surfaces that are parallel to layer I and typically are rectangular with preference fro each device being disc-shaped (see 35 in Figure 5).

In regard to Claim 5, the arrangement disclosed by Clarke can rotate the micro device seat 180 degree in vertical plane (see paragraph [0024] lines 1-3 in page 4).

In regard to Claim 20, Clarke discloses that the □□ can be essentially equal to 90° (see paragraph [0024], lines 1-4, Figure 5).

In regard to Claim 21, Clarke discloses that each of the seats is further capable of positioning the corresponding positions in the microconduit portion of the microchannel structures in any of the microfluidic devices at essentially the same radial distance (see paragraph [0024], Figure 5).

In regard to claim 23, Clark discloses that a microarray consists of multiple layers connected by channels between the layers (see paragraph [0024], Figure 6). Thus, Clark discloses that each microfluidic device comprises plurality of microchannel channels and structures. These microchannel channels and structures can be created by sandwiching three dimensional inert layers created by photolithography technique (see paragraph [0024]). Thus, it is within the capability of a skilled artisan to create at least 50 microchannel structures in a device by increasing the number of structures in a layer and by increasing the number of layers in a device using the photolithography technique disclosed by Clark.

6. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over Clarke in view of Sundberg et al. (US Patent 6,086,825) (Sundberg).

In regard to Claim 6, Clarke discloses a microfluidic device that comprises two essentially planar and parallel opposite sides and edge sides (see 35 in Figure 5, and 6), the microfluidic device has microchannel structure that has an inlet port IP present in an edge side (see Figure 6). Clarke does not specifically teach wettability of the inner walls of the inlet port that permits penetration by self-suction (capillarity) of a predetermined volume of an aqueous liquid. Sundberg discloses microfluidic chip that has fluidic introduction port that uses capillary force to retain the fluid within the port of defined size (see abstract). Sundberg teaches that the port can wick fluid from the surface of a pin, therefore, avoiding the need for complex pipette system (see Col.2, lines 40-52). At time of the invention it would have been obvious to a person of ordinary skill in the art to use a capillary inlet port as disclosed by Sundberg in Clarke's microfluidic chip, in order to avoid the need for complex pipette system.

Response to Arguments

7. Applicant's arguments filed on 11/22/2010 have been fully considered but they are not persuasive.

Applicant argues that “the technical effect that it is possible to process a larger number of microfluidic devices cannot be achieved with the balls as disclosed in Clarke et al. US '470. Even if a slide is rotated so that it gains the same orientation as the orientation stipulated by the present invention, no space is saved since the balls still occupy the same area on the rotary member” (Remark, page 11). In response, if one wants to increase the number of slides in Clark’s device, one can simply change the shape of the slide holder from a $\frac{3}{4}$ volume of ball to a plate to save space, this kind of redesigning is within the capability of a skilled artisan and the result is predictable.

Applicant submits that “The device as disclosed in Clarke et al. US '470 in turn, is designed to run samples of blood on slides having but one single structure each, and which structure is larger in its dimensions than the microchannel structures of the present invention. Therefore, it is not possible to simply add more channels on each slide” (Remark, page 12). Examiner respectfully disagrees. Clark discloses that each microfluidic device comprises plurality of microchannels and structures (see paragraph [0024], Figure 6). These microchannel channels and structures can be created by sandwiching three dimensional inert layers created by photolithography technique (see paragraph [0024]). Thus, it is within the capability of a skilled artisan to create at least 50 microchannel structures in a device by increasing the number of structures in a layer, and by increasing the number of layers in a device using the photolithography technique disclosed by Clark.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT XU whose telephone number is (571)270-5560. The examiner can normally be reached on Mon-Thur 7:30am-5:00pm, Fri 7:30am-4:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571)272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

1/7/2011

/Yelena G. Gakh/
Primary Examiner, Art Unit 1777

RX